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Kokai

OIL AND FAT COMPOSITION FOR FRYING
[Agemono choriyou yushi soseibutu]

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Claims

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1. An oil and fat composition for frying characterized by having 0.005-10 wt% of organic acid monoglyceride and 0.005-10 wt% of polyglycerol fatty acid ester dissolved in an edible oil or fat.
2. The oil and fat composition of Claim 1, wherein the organic acid monoglyceride has an HLB of 3 or higher.
3. The oil and fat composition of Claim 1 or 2, wherein the organic acid of the organic acid glyceride is citric acid.
4. The oil and fat composition of Claim 1, wherein the polyglycerol fatty acid ester has a glycerol polymerization degree of 6 or higher and HLB of 5 or higher.
5. The oil and fat composition of any one of Claims 1-4, wherein the transparent state at 0°C is sustained for at least 5.5 h.

Detailed explanation of the invention

[0001]

Industrial application field

This invention pertains to an oil and fat composition suitable for frying breaded fries, tempura, etc.

[0002]

Prior art

Edible oils and fats have been used in the past for frying tempura and breaded fries. Specific examples of liquid oils among them are rapeseed oil, soybean oil, corn oil, cottonseed oil, safflower oil, high oleic safflower oil, sunflower seed oil, high oleic sunflower seed oil, rice oil, etc., and as solid fats, there are

* [Numbers in right margin indicate pagination of the original text.]

palm oil, lard, etc. However, those previously used oils and fats have problems such as tempura batter blooming insufficiently, frequent oil splatter, difficulty keeping the just-fried texture of fries, insufficient oil drainage, high residual oil in prepared fries, etc.

[0003]

As attempts to solve those problems, the addition of sugar ester (sucrose fatty acid ester), diglyceride (fatty acid diglyceride) or lecithin to edible oils and fats has been proposed (Japanese Kokai Patent Application Nos. Hei 5[1993]-316950, Hei 5[1993]-316951, Hei 6[1994]-153794, Hei 7[1995]-109, Hei 7[1995]-16051, Hei 7[1995]-16052 and Hei 7[1995]-16053).

[0004]

However, the above means has the problem of poor sugar ester dissolution, leading to insufficient storage stability at low temperatures, and it is necessary to add 5-10% of an emulsifier such as diglyceride to maintain the storage stability at low temperatures causing another problem of low smoking point and consequent generation of an undesirable smell. In addition, for the sugar ester to exhibit a satisfactory effect, it is necessary to use a specific component of sugar ester (di or triester), and the compounding of such a specific component leads to increased costs for the oil and fat composition as the final product.

[0005]

Objective of the invention

The objective of this invention is to provide an oil and fat composition for frying, which shows functions of improving batter blooming at the time of frying, inhibiting oil splattering, improving oil draining from cooked fries, reducing the residual oil or fat in cooked fries, reducing oil consumption after

repeated use, sustaining crisp, just-fried batter texture and flavor, showing no opaque color formation or precipitate formation after storage at low temperature, etc., and solving various problems of frying in the prior art.

[0006]

Means to solve the problems

The present inventors conducted diligent studies to accomplish the above objective. As a result, they found that the addition and dissolution of specific amounts of organic acid glyceride and polyglycerol fatty acid ester to oils or fats was successful in providing an oil and fat composition having those functions described above, and they arrived at the this invention.

[0007]

Specifically, the gist of this invention is found in an oil and fat composition for frying characterized by having 0.005-10 wt% of organic acid monoglyceride, preferably with an HLB of 3 or higher, and 0.005-10 wt% of polyglycerol fatty acid ester, preferably with a polymerization degree of 6 or higher and HLB of 5 or higher, dissolved in an edible oil or fat so that its transparent state at 0°C can be sustained for 5.5 h.

[0008]

The oil and fat composition for frying of this invention is explained in detail as follows. The components comprising the oil and fat composition for frying of this invention are edible oil or fat, organic acid monoglyceride and polyglycerol fatty acid ester.

[0009]

As an edible oil or fat, there are liquid oils such as rapeseed oil, soybean oil, corn oil, cottonseed oil, safflower oil, high oleic safflower oil, sunflower seed oil, high oleic sunflower seed oil, rice oil, etc., and as solid fats, there are palm oil, lard, etc. These oils and fats may be used alone or as a mixture of optional proportions. Incidentally, to improve the desired effects of this invention, that is, batter blooming, oil draining, oil splattering prevention, texture and flavor of the batter of fries after standing, residual oil reduction in cooked fries, solubilities of organic monoglyceride and polyglycerol fatty acid ester, low-temperature storage, etc., ester-exchanged oils and fats are preferably used. Specific examples of oils or fats for this transesterification are the same edible oils and fats described above.

[0010]

As an organic monoglyceride, there are those prepared from organic acid, glycerol and fatty acid as basic raw materials by means of esterification. As an organic acid, there are, for example, citric acid, tartaric acid, succinic acid, acetic acid and lactic acid, used alone or as a mixture of 2 or more kinds, and as a fatty acid, there are, for example, acetic acid, palmitic acid, stearic acid, oleic acid, linolic acid, linoleic acid, etc., used alone or as a mixture of 2 or more kinds. In this invention, it is preferable to use an organic acid monoglyceride prepared with citric acid.

[0011]

As a polyglycerol fatty acid ester, it is possible to use fatty acid esters of polyglycerol such as diglycerol, triglycerol, tetraglycerol, hexaglycerol, decaglycerol, etc., having a mean polymerization degree of 2-15, and specific examples of the fatty acid are fatty acids with 12-22 carbon atoms such as

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lauric acid, myristic acid, palmitic acid, stearic acid, oleic acid, linolic acid, linoleic acid, etc., used alone or as a mixture of 2 or more kinds.

[0012]

The oil and fat composition for frying of this invention is prepared by dissolving the above organic acid monoglyceride and polyglycerol fatty acid ester in an edible oil or fat. To 100 wt% of edible oil or fat, 0.005-10 wt%, preferably 0.05-1 wt%, of organic acid monoglyceride and 0.005-10 wt%, preferably 0.05-1 wt%, of polyglycerol fatty acid ester are added. If the amount of either of the organic acid monoglyceride or polyglycerol fatty acid ester is less than 0.005 wt%, there is insufficient improvement of effects such as batter blooming, oil splattering inhibition, oil draining from fries and texture and flavor of fries after standing, and furthermore, a less pronounced effect of reducing the oil content in fries after cooking, achieving no satisfactory effect of this invention. Especially, if the amount of the organic acid monoglyceride is less than 0.005 wt%, the above effects are especially markedly reduced, and on the other hand, if the amount of polyglycerol fatty acid ester is less than 0.005 wt%, those effects of this invention described above are not exhibited over the long term. Furthermore, if the content of either organic acid monoglyceride or polyglycerol fatty acid ester is over 10 wt%, they cannot be dissolved stably in edible oils or fats, causing a tendency to form precipitates at low temperatures.

[0013]

To improve the desired effects of this invention, that is, batter blooming, oil draining, oil splattering prevention, texture and flavor of batter of fries after standing, residual oil reduction in cooked fries, the HLB value of organic acid monoglyceride used is preferably 3 or higher, optimally in the range of 3-15, and in the case of polyglycerol fatty acid ester, the glycerol polymerization degree is 6 or higher, and the

HLB is 5 or higher, optimally, the polymerization degree is in the range of 6-10 and HLB is in the range of 5-13. If the above condition ($\text{HLB} \geq 3$) for the organic acid monoglyceride is unsatisfied, the effects of this invention described above are insufficient, and if the above conditions (polymerization degree of ≥ 6 , $\text{HLB} \geq 5$) for the polyglycerol fatty acid ester are unsatisfied, the effects of this invention described above are not maintained over the long term.

[0014]

The oil and fat composition for frying of this invention is prepared by mixing the edible oil or fat, organic acid monoglyceride and polyglycerol fatty acid esters described above, and if necessary, heating to about 80°C while stirring to achieve dissolution to a homogeneously transparent state, and in a more desirable embodiment of this invention, the oil and fat composition prepared can sustain its transparent state at 0°C for 5.5 h. If those additives (organic acid monoglyceride and/or polyglycerol fatty acid ester) precipitate, there is no problem if the amount is only a trace, but there is a problem that the desired effects of this invention may be reduced.

[0015]

With respect to this point, the oil solubility and low-temperature storage stability are improved for the organic monoglyceride and polyglycerol fatty acid ester by adding a known emulsifier for food products such as glycerol fatty acid ester, polyglycerol fatty acid ester, sorbitan fatty acid ester, sucrose fatty acid ester, propylene glycol fatty acid ester, polyglycerol-condensed ricinolate, etc., used in a suitable amount concomitantly with the additives of this invention. Furthermore, 0.005-10 wt% of medium-chain fatty acid triglyceride may be added to 100 wt% of the edible oil or fat.

[0016]

Application examples

This invention will be explained in detail with the following application and comparative examples.

Application Examples 1-4 and Comparative Examples 1-4

As the organic acid monoglyceride, monoglyceride acetate with an HLB of 0.8 (Poem G-508: manufactured by Riken Vitamin K.K.) and monoglyceride citrate with an HLB of 9.5 (Sunsoft No. 621B, manufactured by Tiayo Chemical K.K.) were used as (a) and (b). Furthermore, the polyglycerol fatty acid ester (c) used was a product with a glycerol polymerization degree of 10 and HLB of 11 (SY Glystar SO-750, manufactured by Sakamoto Yakuhin Kogyo K.K.). The respective additives were added, in the proportions shown in Table 1, to 100 g of rapeseed salad oil (manufactured by Nisshin Oil Mills Ltd.), and dissolved by stirring at 60°C to prepare oil samples.

[0017]

Cooking method for tempura fries

An electric fryer of 21 cm i.d. and 8 cm depth (HGP-106 manufactured by Toshiba) was filled with 700 g of a sample oil and heated to 180°C. 4 slices of sweet potato of about 4 cm diameter and about 1 cm thick were each coated with a tempura batter (100 g of wheat flour homogeneously dispersed in 170 cc of ice water) prepared in advance, then fried for 3 min in the above heated sample oil to obtain tempura fries.

[0018]

In the procedures described above, the batter blooming, oil splattering, oil draining, texture and flavor of batter in fries after cooling, amount of oil absorbed by batter, oil consumption at the time of cooking

and cold storage resistance were evaluated for the oil samples by using the following methods. The results are shown in Table 2.

[0019]

(1) Batter blooming evaluation

Visual observation by 20 professional testers was carried out for prepared tempura fries. The number shown in the table is the average of grades given by the testers based on the standards of 1: excellent, 2: good, 3: fair, 4: poor.

[0020]

(2) Oil splattering evaluation

While frying tempura, a glass plate was horizontally placed at 15 cm from the oil surface. After cooking, the oil that adhered to the glass plate was extracted with diethyl ether to carry out quantitative determination of the oil. The number shown is a result relative to that of rapeseed oil alone set at 100.

[0021]

(3) Oil draining evaluation

The 4 fried slices of sweet potato were allowed to stand on a stainless steel net for about 20 sec and /4 placed on a sheet of homogenous paper for 10 min, allowing the paper to absorb the oil. The portion of the paper with the oil adsorbed was cut out and weighed to determine the amount of oil absorbed. The results shown in the tables are relative to the amount of rapeseed oil used alone set at 100.

[0022]

(4) Evaluation of texture and flavor of batter after cooling

The fries were allowed to stand at 25°C for 1 h after frying and evaluated by 20 professional testers by comparison to equivalent fries within 5 min after frying as a reference. The number shown in the table is the average of the grades given by the testers, based on the standards of 1: same as immediately after frying, 2: slightly inferior to immediately after frying, 3: inferior to immediately after frying, 4: very inferior to immediately after frying.

[0023]

(5) Evaluation of amount of oil absorbed by batter of fries

The fried sweet potato slices were allowed to stand on a stainless steel net for about 20 sec, subsequently, the fried batter was peeled off, placed on a cylindrical paper filter and dried at 105°C in an isothermal dryer for 1 h. Subsequently, ethyl ether and Soxhlet extractor were used to carry out extraction, the extract was cooled in a desiccator for 30 min, and the weight was measured to determine the amount of oil. Furthermore, the amount of moisture was concomitantly measured with the measurement of the amount of oil by drying the peeled batter in an isothermal dryer at 105°C until the weight no longer changed to calculate the water content. The amount of oil absorbed by the batter was determined with formula (I) as follows.

[0024]

[Formula 1]

$$\text{Amount of oil absorbed (\%)} = \frac{\text{Solid content of tempura batter before frying}}{\text{(solid content of batter after frying)}} \times (\text{oil in the batter after frying}) \quad (\text{I})$$

[0025]

In this case, the solid content (wt%) of the tempura batter before frying is a value calculated from the tempura batter composition described above (37.04), and the solid content (wt%) of tempura batter after frying = 100 - (oil in the batter + water in the batter). The value shown in the table is a value relative to rapeseed oil used alone set at 100.

[0026]

(6) Evaluation of consumption of oil during cooking

The tempura cooking procedures were carried out 20 times with an interval of 30 min, and the amount of oil remaining in the fryer was measured. The number shown in the table is a result relative to the result of rapeseed oil used alone set at 100.

[0027]

(7) Cold storage resistance evaluation

100 g of an oil sample were placed in a glass sample bottle, the bottle was immersed in an ice water bath at 0°C for 5.5 h, and subsequently, the opacity or precipitation was evaluated. The result was evaluated according to the following grade: □clear, O: almost clear, X: opaque or precipitate formed.

[0028]

TABLE 1. Sample oil composition (unit: wt%)

①	② 成分表示例 No.							
	1	2	3	4	5	6	7	8
(a)	0.1	——	#	——	0.001	——	15	——
(b)	——	0.1	——	#	——	0.001	——	15
(c)	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1

Key: 1 Additive

2 Sample No.

[0029]

TABLE 2. Evaluation of oil samples and fries

⑤	① 油の名称 種類	② 試料番号				③ 比較例				④ 評価
		1	2	3	4	1	2	3	4	
	評価項目	1	2	3	4	1	2	3	4	
	油の性質	1	2	3	4	1	2	3	4	
	油の量	10	11	12	13	14	15	16	17	18
	油の温度	10	11	12	13	14	15	16	17	18
	油の粘度	10	11	12	13	14	15	16	17	18
	油の臭気	10	11	12	13	14	15	16	17	18
	油の味	10	11	12	13	14	15	16	17	18
	油の色	10	11	12	13	14	15	16	17	18
	油の透明度	10	11	12	13	14	15	16	17	18
	油の安定性	10	11	12	13	14	15	16	17	18
	油の保存性	10	11	12	13	14	15	16	17	18

Key: 1 Sample oil no.

2 Application example

3 Comparative example

4 Rapeseed oil

5 Evaluation item

6 Batter blooming

Oil splattering

Oil draining

Texture and flavor after cooling

Amount of oil absorbed by batter

Oil consumption while cooking

Cold resistance

[0030]

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Application Examples 5-8 and Comparative Examples 5-8

As the organic acid monoglyceride, monoglyceride acetate with an HLB of 0.8 (Poem G-508: manufactured by Riken Vitamin K.K.) and monoglyceride lactate with an HLB of 7.5 (Sunsoft No. 661AS, manufactured by Tiayo Chemical K.K.) were used as (d) and (e). Furthermore, the polyglycerol fatty acid ester (f) used was a product with a glycerol polymerization degree of 10 and HLB of 11 (SY Glystar SO-750, manufactured by Sakamoto Yakuhin Kogyo K.K.). The respective additives were added in the proportions shown in Table 3 to rapeseed salad oil, and dissolved by stirring at 60°C to prepare oil samples. The same cooking and evaluation methods as those used in Application Example 1 were carried out. The results obtained are shown in Table 4.

[0031]

TABLE 3. Sample oil composition (unit: wt%)

① 添 加 剤	② サ ン プ ル 油 の 組 成							
	8	10	11	12	13	14	15	16
(d)	8.3	—	13	—	0.692	—	14	—
(e)	—	8.3	—	13	—	0.692	—	14
(f)	2.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Key: 1 Additive

2 Sample No.

[0032]

TABLE 4. Evaluation of oil samples and fries

⑤	① 油の番号 No.	② 油の質 Oil quality				③ 炸 炸 炸 Frying				④
		色	臭	味	質	色	臭	味	質	
⑥	炸 炸 炸	色	臭	味	質	色	臭	味	質	炸 炸 炸
	炸 炸 炸	色	臭	味	質	色	臭	味	質	炸 炸 炸
	炸 炸 炸	色	臭	味	質	色	臭	味	質	炸 炸 炸
	炸 炸 炸	色	臭	味	質	色	臭	味	質	炸 炸 炸
	炸 炸 炸	色	臭	味	質	色	臭	味	質	炸 炸 炸
	炸 炸 炸	色	臭	味	質	色	臭	味	質	炸 炸 炸
	炸 炸 炸	色	臭	味	質	色	臭	味	質	炸 炸 炸
	炸 炸 炸	色	臭	味	質	色	臭	味	質	炸 炸 炸
	炸 炸 炸	色	臭	味	質	色	臭	味	質	炸 炸 炸
	炸 炸 炸	色	臭	味	質	色	臭	味	質	炸 炸 炸

Note: Same evaluation standards as those used in Application Example 1

- Key: 1 Sample oil no.
- 2 Application example
- 3 Comparative example
- 4 Rapeseed oil
- 5 Evaluation item
- 6 Batter blooming
- Oil splattering
- Oil draining
- Texture and flavor after cooling
- Amount of oil absorbed by batter
- Oil consumption while cooking
- Cold resistance

[0033]

Application Examples 9-12 and Comparative Examples 9-12

Polyglycerol fatty acid ester with a glycerol polymerization degree of 4 and HLB of 8 (SY Glystar MS-310, manufactured by Sakamoto Yakuhin Kogyo K.K.) and polyglycerol fatty acid ester with a glycerol polymerization degree of 6 and HLB of 7 (SY Glystar TS-500, manufactured by Sakamoto Yakuhin Kogyo K.K.) as (g) and (h) and monoglyceride diacetyltartrate with an HLB of 9.5 (Poem W-10, manufactured by Riken Vitamin K.K.) (i) were used, the respective additives were added in the proportions shown in Table 5 to rapeseed salad oil, and dissolved by stirring at 60°C to prepare oil samples. After 20 batches of the tempura cooking procedures of Application Example 1, the same evaluation methods as those used in Application Example 1 were carried out for the 20th batch cooked. The results obtained are shown in Table 6.

[0034]

TABLE 5. Sample oil composition (unit: wt%)

1	2							
	3	4	5	6	7	8	9	10
(a)	0.002	0.002	0	0.002	0.002	0	0	0
(b)	0.002	0.002	0	0	0.002	0.002	0	0
(c)	0	0	0	0	0	0	0	0

Key: 1 Additive
 2 Sample No.

TABLE 6. Evaluation of oil samples and fries

サンプル数 個数	第 1 群				第 2 群				第 3 群				計
	1	2	3	4	5	6	7	8	9	10	11	12	
群別項目	11	12	13	14	15	16	17	18	19	20	21	22	計
第 1 群	2	1	1	1	2	2	2	2	2	2	2	2	2
第 2 群	22	23	24	25	26	27	28	29	30	31	32	33	220
第 3 群	34	35	36	37	38	39	40	41	42	43	44	45	330
第 4 群	46	47	48	49	50	51	52	53	54	55	56	57	440
第 5 群	58	59	60	61	62	63	64	65	66	67	68	69	550
第 6 群	70	71	72	73	74	75	76	77	78	79	80	81	660
第 7 群	82	83	84	85	86	87	88	89	90	91	92	93	770
第 8 群	94	95	96	97	98	99	100	101	102	103	104	105	880
第 9 群	106	107	108	109	110	111	112	113	114	115	116	117	990
第 10 群	118	119	120	121	122	123	124	125	126	127	128	129	1100
第 11 群	130	131	132	133	134	135	136	137	138	139	140	141	1210
第 12 群	142	143	144	145	146	147	148	149	150	151	152	153	1320
第 13 群	154	155	156	157	158	159	160	161	162	163	164	165	1430
第 14 群	166	167	168	169	170	171	172	173	174	175	176	177	1540
第 15 群	178	179	180	181	182	183	184	185	186	187	188	189	1650
第 16 群	190	191	192	193	194	195	196	197	198	199	200	201	1760
第 17 群	202	203	204	205	206	207	208	209	210	211	212	213	1870
第 18 群	214	215	216	217	218	219	220	221	222	223	224	225	1980
第 19 群	226	227	228	229	230	231	232	233	234	235	236	237	2090
第 20 群	238	239	240	241	242	243	244	245	246	247	248	249	2200
第 21 群	250	251	252	253	254	255	256	257	258	259	260	261	2310
第 22 群	262	263	264	265	266	267	268	269	270	271	272	273	2420
第 23 群	274	275	276	277	278	279	280	281	282	283	284	285	2530
第 24 群	286	287	288	289	290	291	292	293	294	295	296	297	2640
第 25 群	298	299	300	301	302	303	304	305	306	307	308	309	2750
第 26 群	310	311	312	313	314	315	316	317	318	319	320	321	2860
第 27 群	322	323	324	325	326	327	328	329	330	331	332	333	2970
第 28 群	334	335	336	337	338	339	340	341	342	343	344	345	3080
第 29 群	346	347	348	349	350	351	352	353	354	355	356	357	3190
第 30 群	358	359	360	361	362	363	364	365	366	367	368	369	3300
第 31 群	370	371	372	373	374	375	376	377	378	379	380	381	3410
第 32 群	382	383	384	385	386	387	388	389	390	391	392	393	3520
第 33 群	394	395	396	397	398	399	400	401	402	403	404	405	3630
第 34 群	406	407	408	409	410	411	412	413	414	415	416	417	3740
第 35 群	418	419	420	421	422	423	424	425	426	427	428	429	3850
第 36 群	430	431	432	433	434	435	436	437	438	439	440	441	3960
第 37 群	442	443	444	445	446	447	448	449	450	451	452	453	4070
第 38 群	454	455	456	457	458	459	460	461	462	463	464	465	4180
第 39 群	466	467	468	469	470	471	472	473	474	475	476	477	4290
第 40 群	480	481	482	483	484	485	486	487	488	489	490	491	4400
第 41 群	492	493	494	495	496	497	498	499	500	501	502	503	4510
第 42 群	504	505	506	507	508	509	510	511	512	513	514	515	4620
第 43 群	516	517	518	519	520	521	522	523	524	525	526	527	4730
第 44 群	528	529	530	531	532	533	534	535	536	537	538	539	4840
第 45 群	540	541	542	543	544	545	546	547	548	549	550	551	4950
第 46 群	552	553	554	555	556	557	558	559	560	561	562	563	5060
第 47 群	564	565	566	567	568	569	570	571	572	573	574	575	5170
第 48 群	576	577	578	579	580	581	582	583	584	585	586	587	5280
第 49 群	588	589	590	591	592	593	594	595	596	597	598	599	5390
第 50 群	600	601	602	603	604	605	606	607	608	609	610	611	5500
第 51 群	612	613	614	615	616	617	618	619	620	621	622	623	5610
第 52 群	624	625	626	627	628	629	630	631	632	633	634	635	5720
第 53 群	636	637	638	639	640	641	642	643	644	645	646	647	5830
第 54 群	648	649	650	651	652	653	654	655	656	657	658	659	5940
第 55 群	660	661	662	663	664	665	666	667	668	669	670	671	6050
第 56 群	672	673	674	675	676	677	678	679	680	681	682	683	6160
第 57 群	684	685	686	687	688	689	690	691	692	693	694	695	6270
第 58 群	696	697	698	699	700	701	702	703	704	705	706	707	6380
第 59 群	708	709	710	711	712	713	714	715	716	717	718	719	6490
第 60 群	720	721	722	723	724	725	726	727	728	729	730	731	6600
第 61 群	732	733	734	735	736	737	738	739	740	741	742	743	6710
第 62 群	744	745	746	747	748	749	750	751	752	753	754	755	6820
第 63 群	756	757	758	759	760	761	762	763	764	765	766	767	6930
第 64 群	768	769	770	771	772	773	774	775	776	777	778	779	7040
第 65 群	780	781	782	783	784	785	786	787	788	789	790	791	7150
第 66 群	792	793	794	795	796	797	798	799	800	801	802	803	7260
第 67 群	804	805	806	807	808	809	810	811	812	813	814	815	7370
第 68 群	816	817	818	819	820	821	822	823	824	825	826	827	7480
第 69 群	828	829	830	831	832	833	834	835	836	837	838	839	7590
第 70 群	840	841	842	843	844	845	846	847	848	849	850	851	7700
第 71 群	852	853	854	855	856	857	858	859	860	861	862	863	7810
第 72 群	864	865	866	867	868	869	870	871	872	873	874	875	7920
第 73 群	876	877	878	879	880	881	882	883	884	885	886	887	8030
第 74 群	888	889	890	891	892	893	894	895	896	897	898	899	8140
第 75 群	900	901	902	903	904	905	906	907	908	909	910	911	8250
第 76 群	912	913	914	915	916	917	918	919	920	921	922	923	8360
第 77 群	924	925	926	927	928	929	930	931	932	933	934	935	8470
第 78 群	936	937	938	939	940	941	942	943	944	945	946	947	8580
第 79 群	948	949	950	951	952	953	954	955	956	957	958	959	8690
第 80 群	960	961	962	963	964	965	966	967	968	969	970	971	8800
第 81 群	972	973	974	975	976	977	978	979	980	981	982	983	8910
第 82 群	984	985	986	987	988	989	990	991	992	993	994	995	9020
第 83 群	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	9130
第 84 群	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	9240
第 85 群	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	9350
第 86 群	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	9460
第 87 群	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	9570
第 88 群	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	9680
第 89 群	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	9790
第 90 群	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	9900
第 91 群	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	10010
第 92 群	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	10120
第 93 群	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	10230
第 94 群	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	10340
第 95 群	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	10450
第 96 群	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	10560
第 97 群	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	10670
第 98 群	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	10780
第 99 群	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	10890
第 100 群	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	11000
第 101 群	1212	1213											

Note: Same evaluation standards as those used in Application Example 1

Key: 1 Sample oil no.

2 Application example

3 Comparative example

4 Rapeseed oil

5 Evaluation item

6 Batter blooming

Oil splattering

Oil draining

Texture and flavor after cooling

Amount of oil absorbed by batter

Oil consumption while cooking

Cold resistance

[0036]

Application Examples 13-16 and Comparative Examples 13-16

Polyglycerol fatty acid ester with a glycerol polymerization degree of 10 and HLB of 3 (SY Glystar DAS-750, manufactured by Sakamoto Yakuhin Kogyo K.K.) and polyglycerol fatty acid ester with a glycerol polymerization degree of 10 and HLB of 10 (SY Glystar TS-750, manufactured by Sakamoto Yakuhin Kogyo K.K.) as (j) and (k) and monoglyceride succinate with an HLB of 8.5 (Sunsoft No. 681NU, manufactured by Taiyo Kagaku K.K.) (l) were used, the respective additives were added in the proportions shown in Table 7 to rapeseed salad oil, and dissolved by stirring at 60°C to prepare oil samples. The same cooking and evaluation methods as those used in Application Example 9 were carried out. The results obtained are shown in Table 8.

[0037]

TABLE 7. Sample oil composition (unit: wt%)

①	②							
	サンザネ樹材の							
部材	20	25	27	28	29	31	33	
(j)	0.2	—	7	—	0.004	—	12	
(k)	—	0.2	—	7	—	0.004	12	
(l)	0.005	0.005	0.005	0.005	0.005	0.005	0.005	

Key: 1 Additive
 2 Sample No.

[0038]

TABLE 8. Evaluation of oil samples and fries

⑤ 評価項目 項目名	② 実 証 例				③ 比 較 例				④ —
	13	14	15	16	17	18	19	20	
評価項目	23	24	25	26	27	28	29	30	31
花 油 油 質	3	1	1	1	3	2	2	1	4
油 質 油 質	32	33	34	35	36	37	38	39	40
油 質 油 質	41	42	43	44	45	46	47	48	49
油 質 油 質	50	51	52	53	54	55	56	57	58
油 質 油 質	59	60	61	62	63	64	65	66	67
油 質 油 質	68	69	70	71	72	73	74	75	76
油 質 油 質	77	78	79	80	81	82	83	84	85
油 質 油 質	86	87	88	89	90	91	92	93	94
油 質 油 質	95	96	97	98	99	100	101	102	103

Note: Same evaluation standards as those used in Application Example 1

- Key: 1 Sample oil no.
- 2 Application example
- 3 Comparative example
- 4 Rapeseed oil
- 5 Evaluation item
- 6 Batter blooming
- Oil splattering
- Oil draining
- Texture and flavor after cooling
- Amount of oil absorbed by batter
- Oil consumption while cooking
- Cold resistance

[0039]

Effect of the invention

The oil and fat composition for frying of this invention has excellent cold storage resistance, and when it is used in frying, the batter blooming is improved, the oil draining from the batter after frying is good, the texture and flavor of the batter of fries after cooling are improved, and the amount of oil absorbed by the batter is reduced. Therefore, the fries prepared taste good with good texture and flavor, and at the same time, the oil splattering during cooking is inhibited, reducing the contamination of the kitchen exhaust fan, the consumption of oil after repeated cooking is low, and it is effective for comfortable frying.